Maximizing Operational Effectiveness through Acquisition Logistics

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Motivation for the Supportability Assessment Guide

- **Enhanced emphasis on Supportability in the DOD 5000 Acquisition Framework**
- **Real need to reduce the Logistics Footprint and System Support Costs**
- **Evolution towards Focused and Expeditionary Logistics – Rapid Deployment**

- **Issues to be Addressed:**
  - **The haze with regard to the Supportability Engineering and Logistics lexicon needs to be cleared**
  - **Design for Reliability, Maintainability, and Supportability methods and tools integration into the DOD 5000 Acquisition Framework**
  - **Logistics Criteria, Information, and Activities for each Phase**

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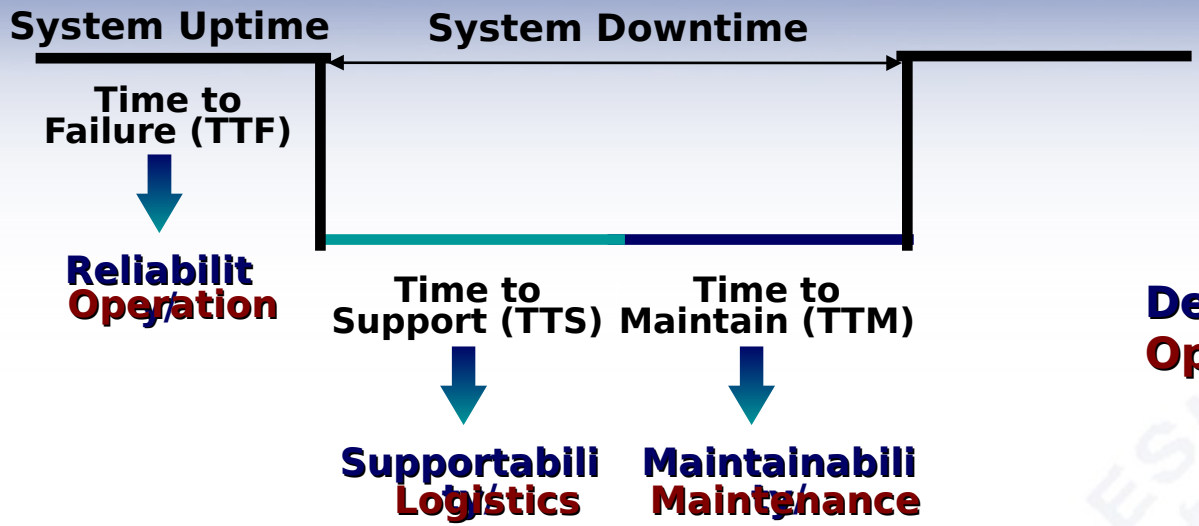
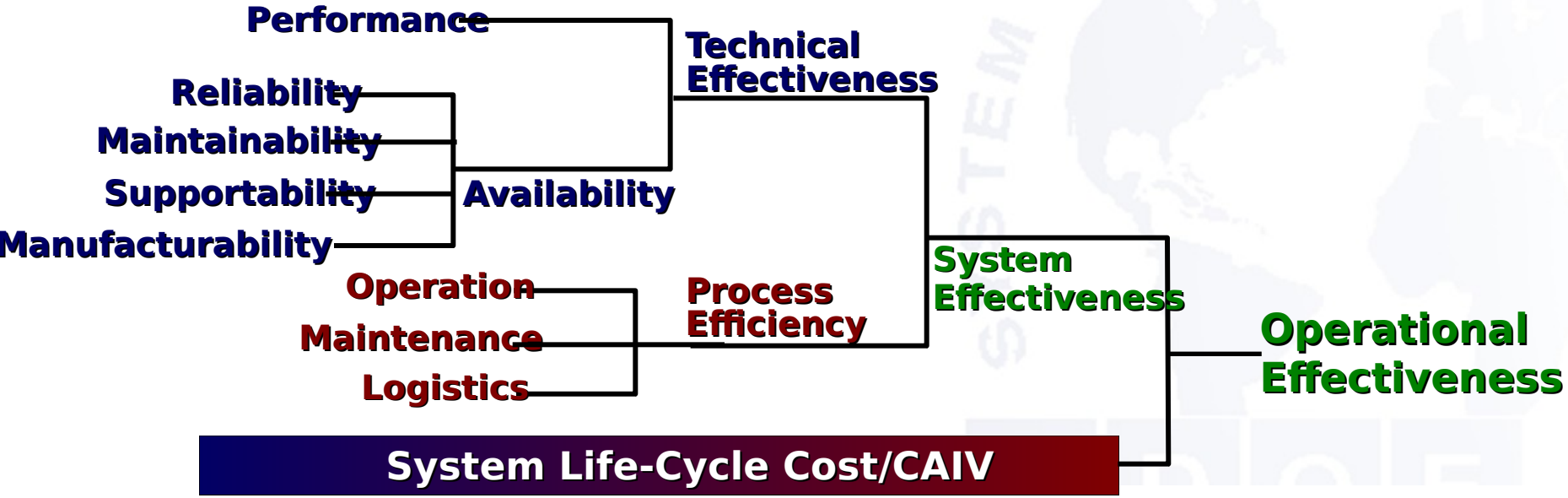
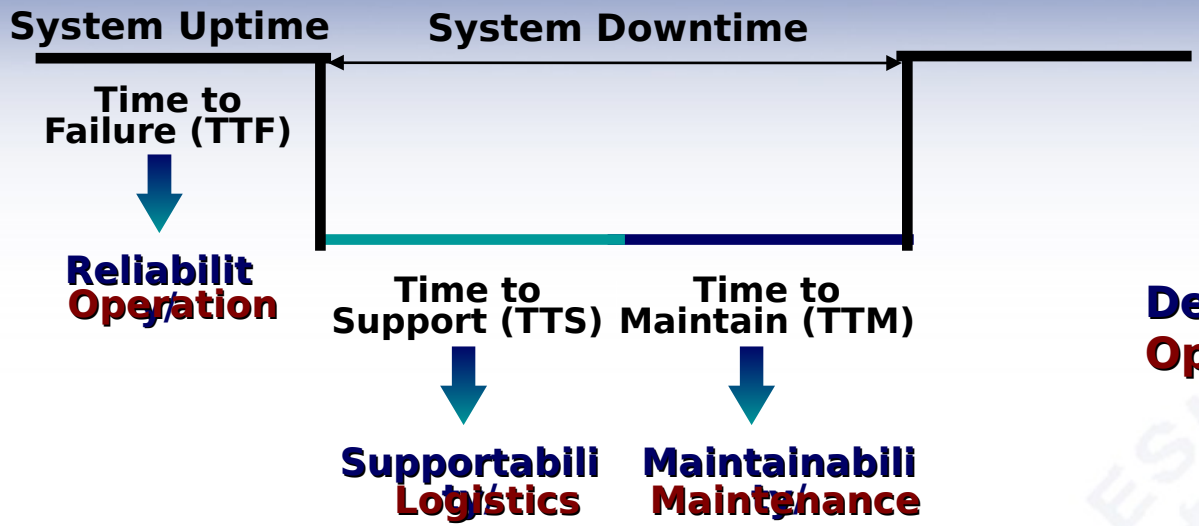
System Operational Effectiveness: Customer Perspective



Design "Cause"
Operational "Effect"



System Operational Effectiveness: Contractor Perspective



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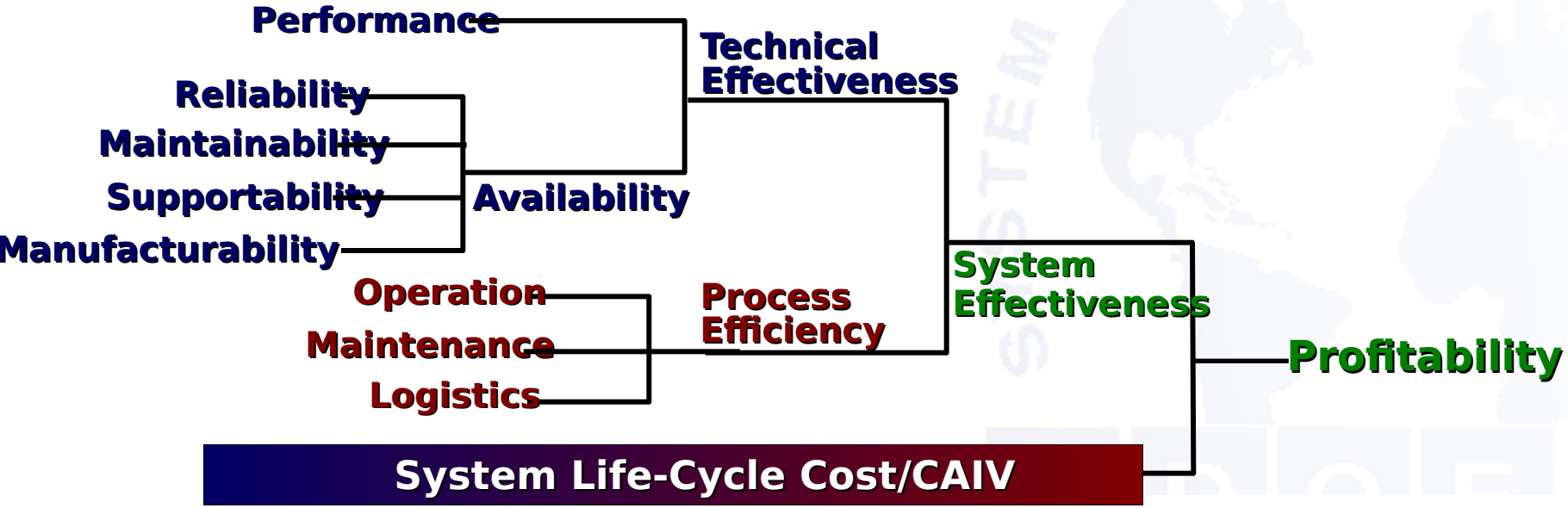

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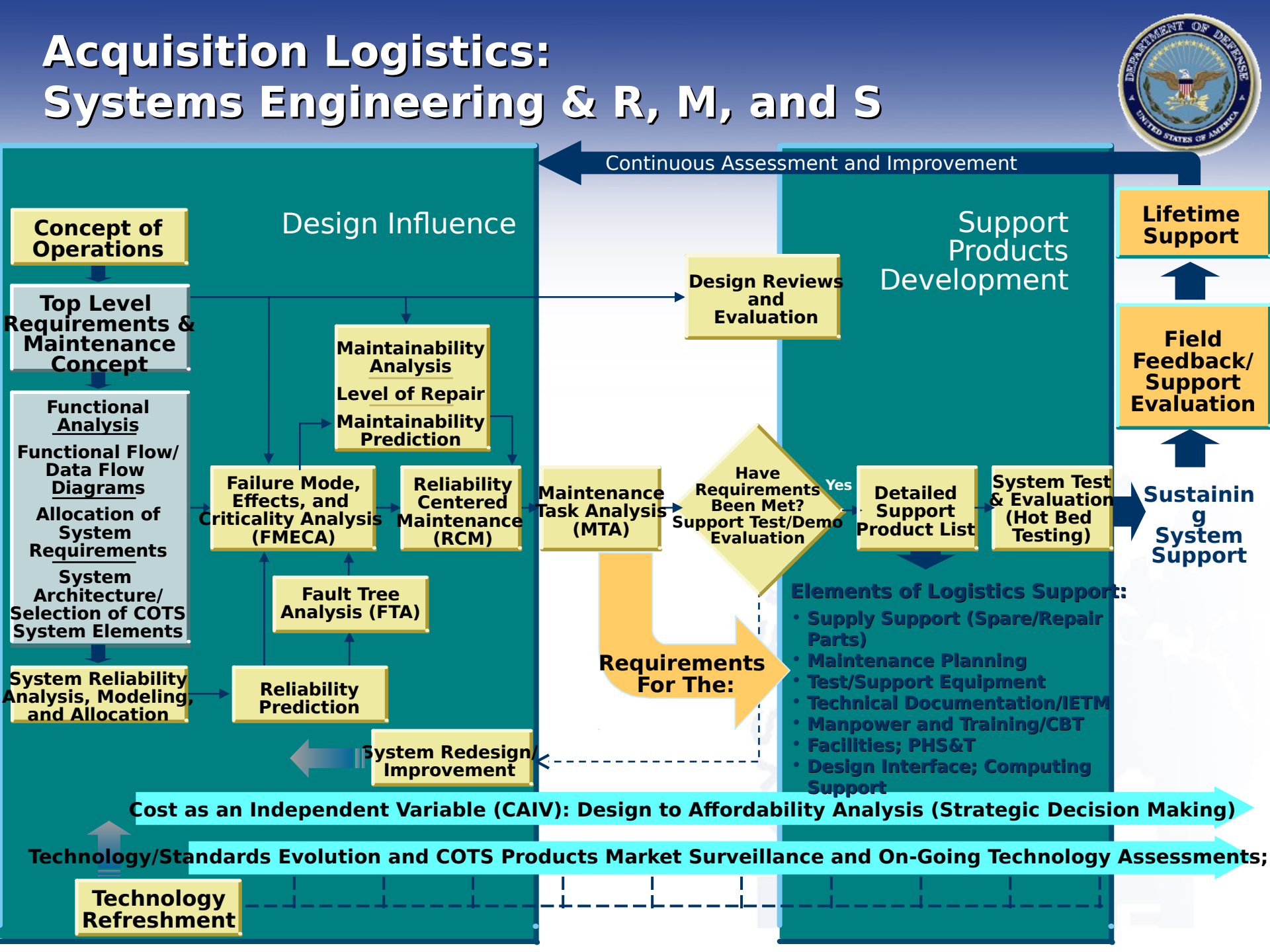
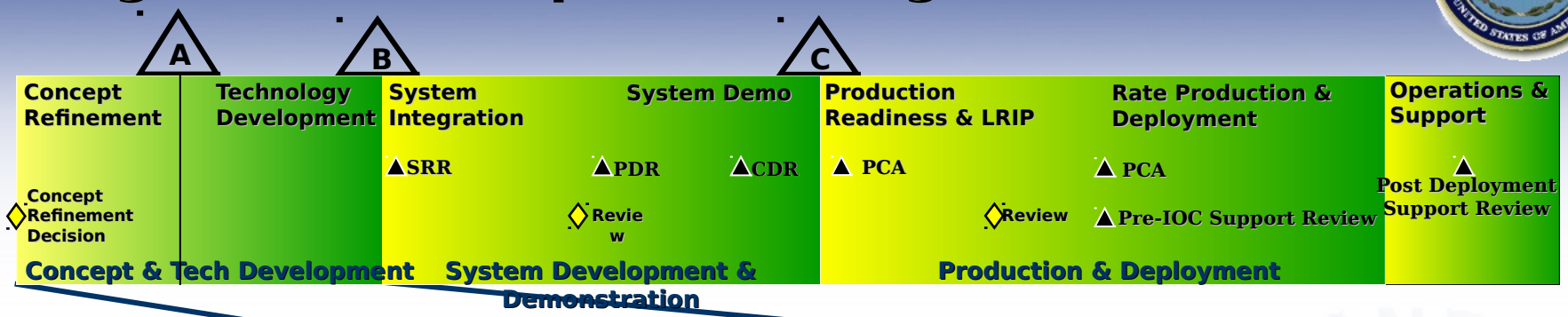
Acquisition Logistics: Systems Engineering & R, M, and S


Continuous Assessment and Improvement
Design Influence
Support Products Development
Concept of Operations
Top Level Requirements & Maintenance Concept
Functional Analysis
Functional Flow/ Data Flow Diagrams
Allocation of System Requirements
System Architecture/ Selection of COTS System Elements
System Reliability Analysis, Modeling, and Allocation
Reliability Prediction
Fault Tree Analysis (FTA)
Failure Mode, Effects, and Criticality Analysis (FMECA)
Reliability Centered Maintenance (RCM)
Maintainability Analysis
Level of Repair
Maintainability Prediction
Design Reviews and Evaluation
Maintenance Task Analysis (MTA)
Have Requirements Been Met? Support Test/Demo Evaluation
Yes
Detailed Support Product List
System Test & Evaluation (Hot Bed Testing)
Lifetime Support
Field Feedback/ Support Evaluation
Sustaining System Support
Requirements For The:
Elements of Logistics Support:
• Supply Support (Spare/Repair Parts)
• Maintenance Planning
• Test/Support Equipment
• Technical Documentation/IETM
• Manpower and Training/CBT
• Facilities; PHS&T
• Design Interface; Computing Support
System Redesign/ Improvement
Cost as an Independent Variable (CAIV): Design to Affordability Analysis (Strategic Decision Making)
Technology/Standards Evolution and COTS Products Market Surveillance and On-Going Technology Assessments;
Technology Refreshment

DOD 5000 Acquisition Framework: Integration of Acquisition Logistics



Identification of Stakeholders, needed capabilities and priorities:

- Functional – Mission – Capabilities
- Operational and Support Requirements
- Affordability Requirements
- Technology Assessment & Opportunities

INPUTS: ICD, CDD

Generation, Evaluation, & Selection of Support and Maintenance Concepts and Technologies

Development of System Operations, Support Use Case Scenarios

System Architecture

Technical Architecture

Definition of System Support Objectives

Feedback and Iteration

OUTPUTS: Validated System Support and Maintenance Objectives and Requirements

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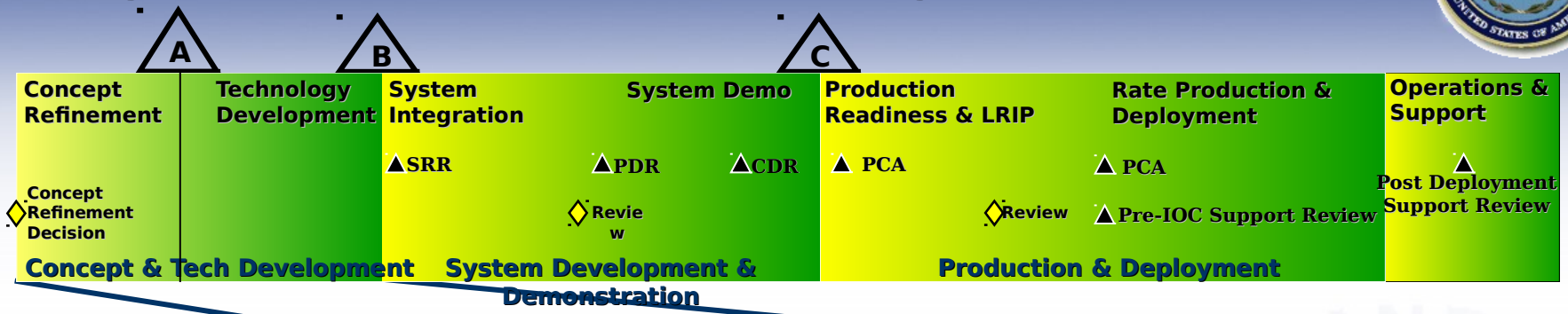

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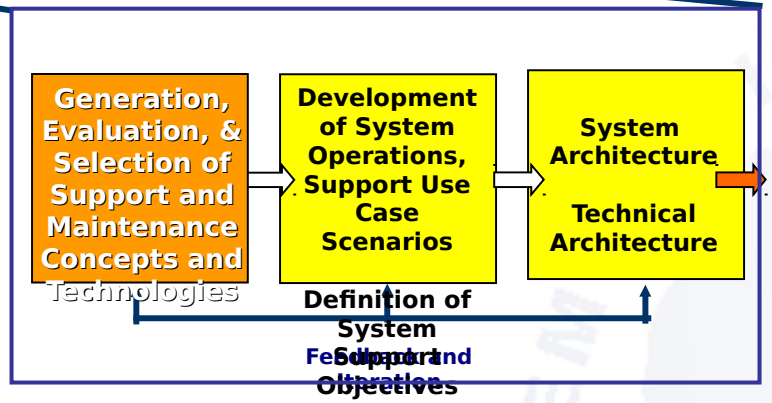

Generation, Evaluation, & Selection of Support and Maintenance Concepts and Technologies
Development of System Operations, Support Use Case Scenarios
System Architecture
Technical Architecture
Definition of System Support and Maintenance Objectives
Feedback and Iteration

OUTPUTS: Validated System Support and Maintenance Objectives and Requirements

ICD, CDD, CPD, System Concept Selected, Technologies Selected

Drives the Operational Concept

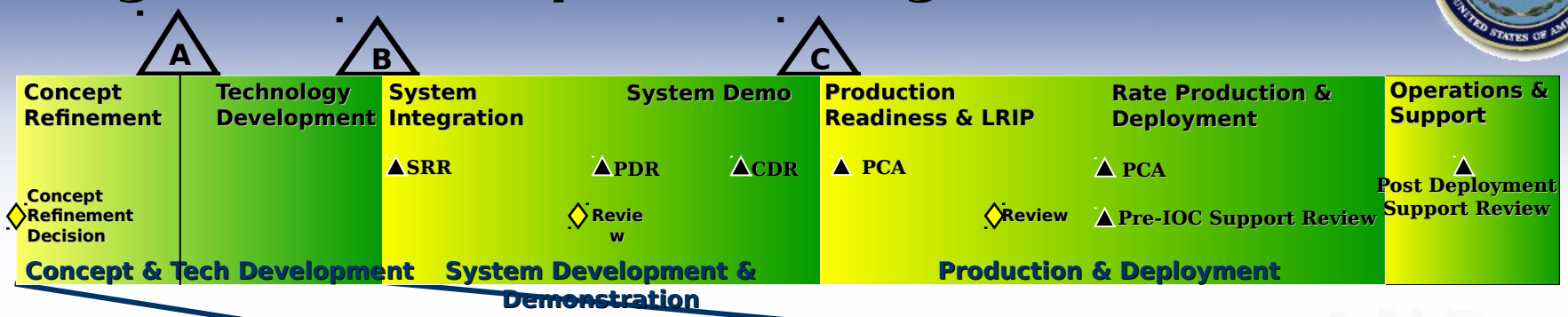
- Operational Profiles and Use Case Scenarios (Mission Capability Packages)
- Utilization Rates
- Utilization Environment and Geographical Distribution
- System Effectiveness Factors
- Operational Horizon and System

System Support and Maintenance Concept Selected, Technologies Selected

Drives the Maintenance Concept

- System Maintenance Profiles and Use Case Scenarios (Support Capability Packages)
- Reliability and Maintenance Rates
- Support Environment and Locations
- Support and Maintenance Effectiveness Factors

DOD 5000 Acquisition Framework: Integration of Acquisition Logistics



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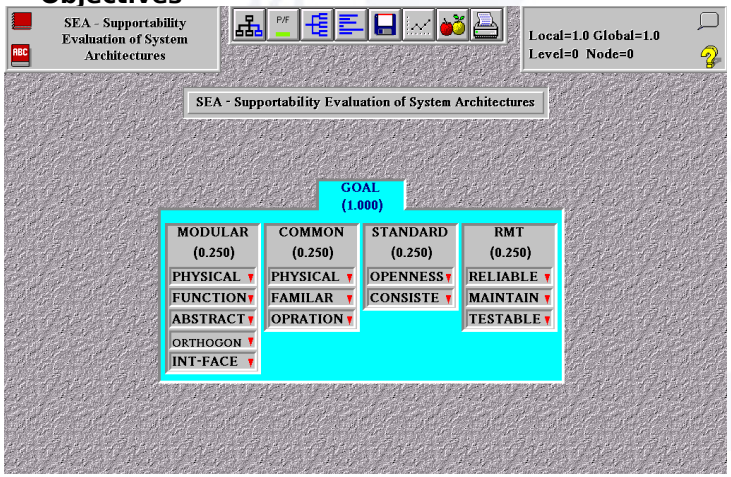
OUTPUTS: Validated System Support and Maintenance Objectives and Requirements



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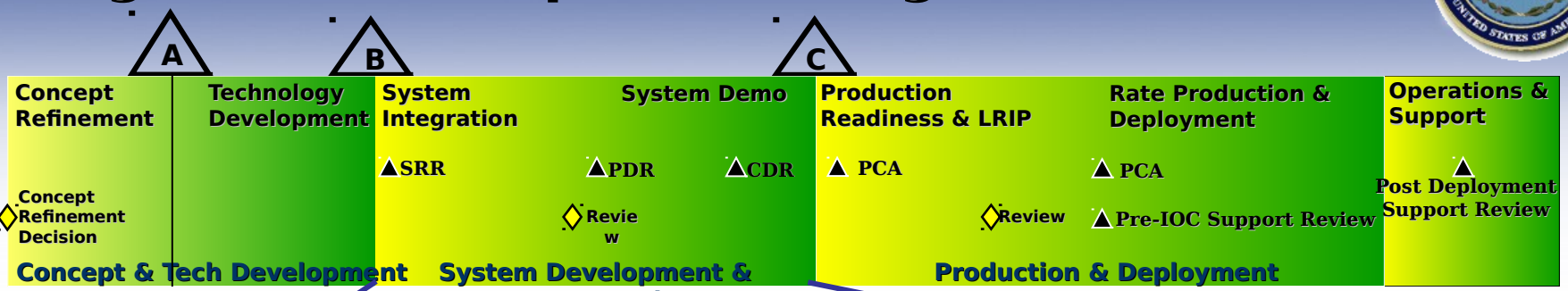
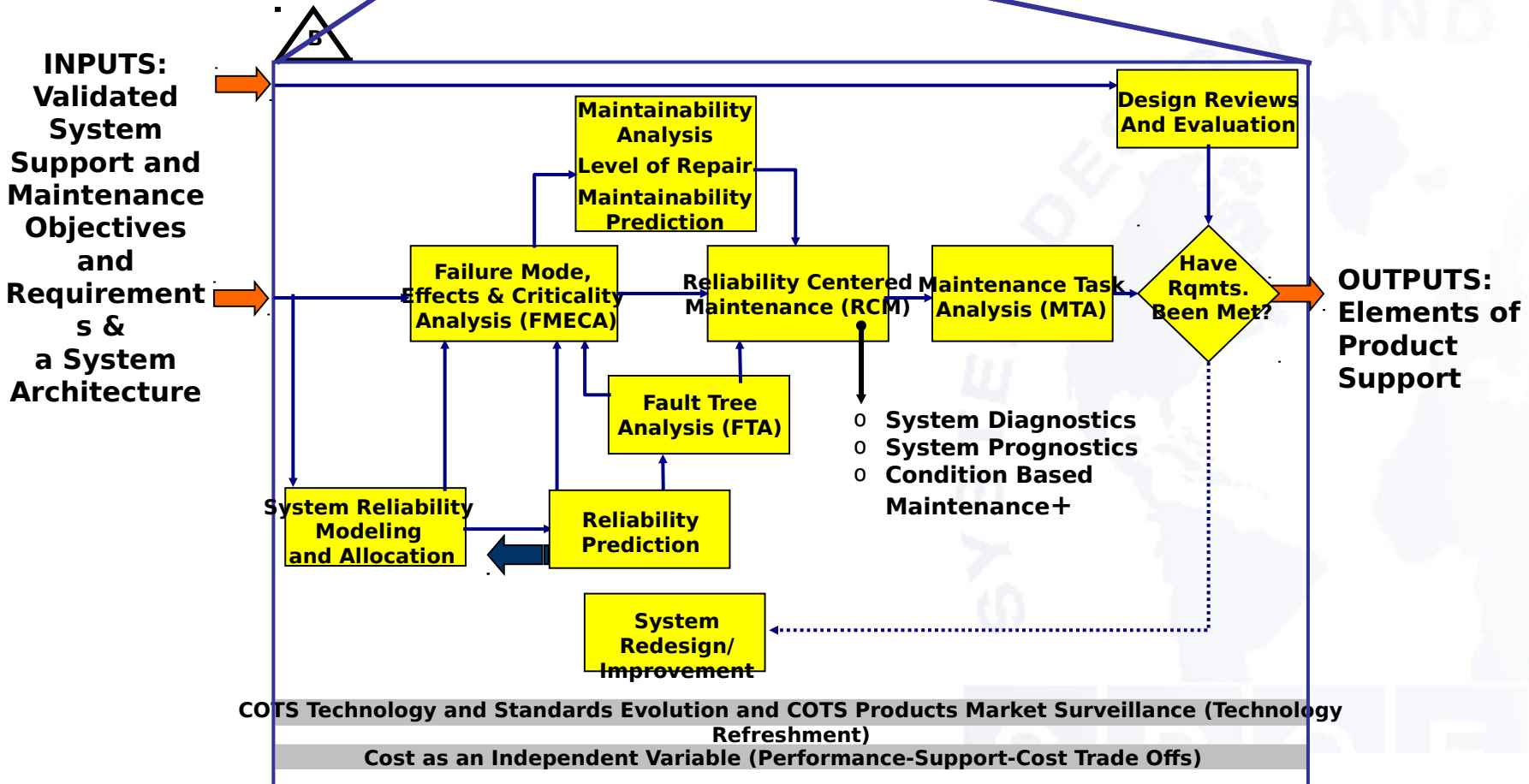
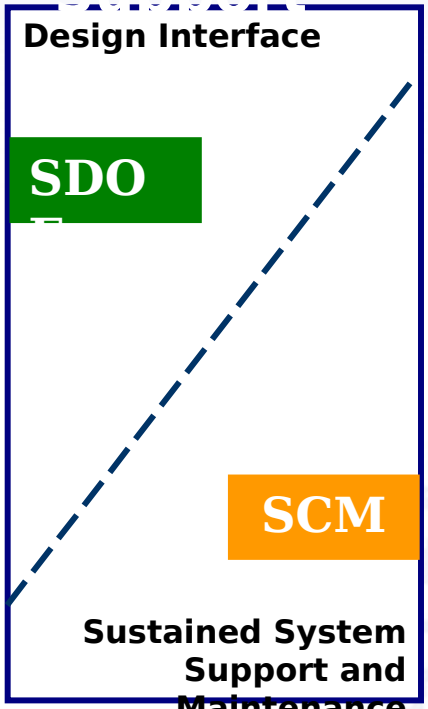



B
INPUTS: Validated System Support and Maintenance Objectives and Requirements & a System Architecture
Maintainability Analysis
Level of Repair
Maintainability Prediction
Design Reviews And Evaluation
Failure Mode, Effects & Criticality Analysis (FMECA)
Reliability Centered Maintenance (RCM)
Maintenance Task Analysis (MTA)
Have Rqmts. Been Met?
OUTPUTS: Elements of Product Support
Fault Tree Analysis (FTA)
o System Diagnostics
o System Prognostics
o Condition Based Maintenance+
System Reliability Modeling and Allocation
Reliability Prediction
System Redesign/ Improvement
COTS Technology and Standards Evolution and COTS Products Market Surveillance (Technology Refreshment)
Cost as an Independent Variable (Performance-Support-Cost Trade Offs)

Design the Support & Support the Design

Design for Support

- Product Support Strategy Development
  - Develop/Implement PBL Plan
- Requirements Generation
  - R, M, S, Diagnostics, Prognostics
- Requirements Determination
- Application of the Systems Engineering Process
- TOC Assessment
- Establish Maintenance and Support Plan – Determine Maintenance and Support Requirements; RCM; MTA
- Deliver Support to Operational Sites



Continuous Assessment and Improvement

- Field Program Management
  - Maintain PBL Plan
  - Logistics Elements
  - Obsolescence/Tech. Refresh/DMS
  - Spares Re-Procurement
- Application of the SE Process
- Pulse of the Customer
  - 24/7 Contact
- Product Availability Analysis
  - Operational Effectiveness
  - Top Degraders & RCM/CBM Sustainment
- Affordability Analysis
  - O&S Cost Assessments/DLR Cost & Avail.
- Safety

Support the Design for Operational Effectiveness

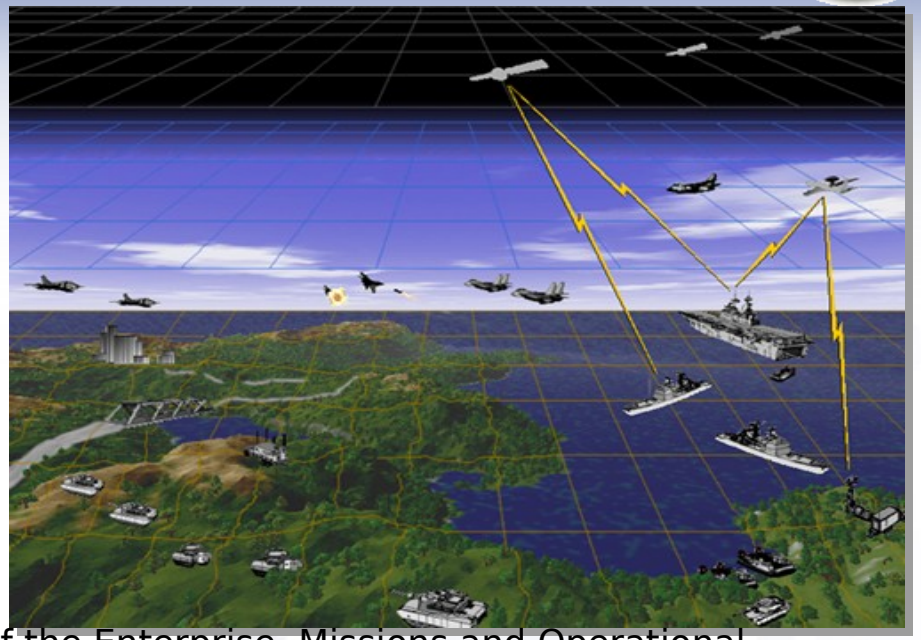
SDOE – System Design for Operational Effectiveness

SCM – Supply Chain Management

What is Systems Integration?
Support System Integration (PBL)

Definition

- From Webster's Revised Unabridged Dictionary (1913) (web1913)
  - **Integration** \In`te*gra”tion\, **n.[L.** integratio **a** renewing, restoring**:** cf. F. int[`e]gration.] **1. The act or process of making whole or entire.**



Definition

- Systems Integration is an “Entire View” of the Enterprise, Missions and Operational Environments Achieved By Combining Capabilities of Systems, Applications, Operators, & Support to Maximize Performance
- The Role of a System Integrator Evolves from Providing Products, Systems, & System Elements.. to Providing Functionality or Solutions
  - **Role of a Support Systems Integrator Evolves from Providing Spares, Training, Documentation, and Facilities… to Providing Readiness Levels and Sustained Operational and Support Capability**

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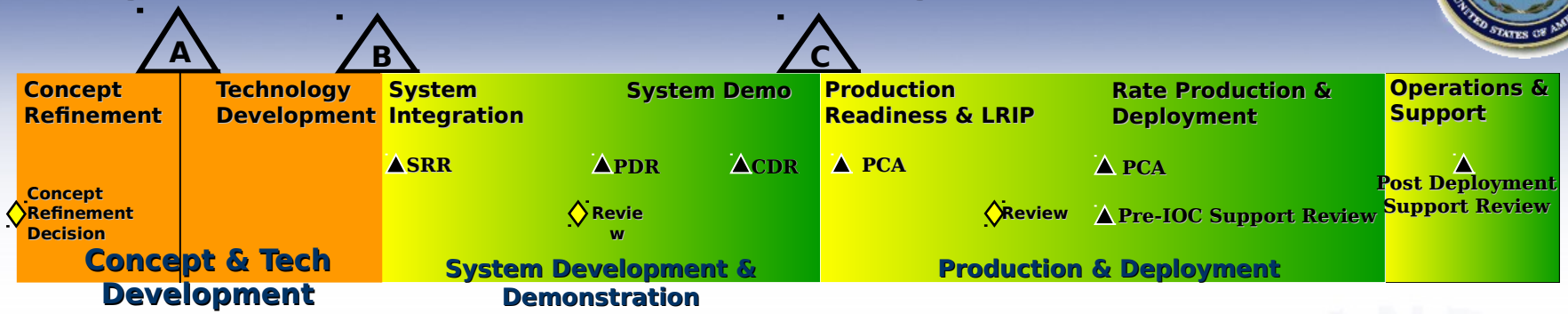

Key logistics criteria for consideration during Concept Refinement and Technology Development include:

- Forecast the physical and operational maintenance environment of the proposed system.
- Given the forecasted environment, assess the functional characteristics of the proposed system, its complexity, and the obstacles and enablers to effective sustainment in that environment.
- Assess the impact of the proposed system on the maintenance capabilities planned for the period in which the system will be introduced.
- Assess preliminary manpower and personnel requirements and constraints in both quantity and skill levels, and use of contractor support.
- Begin compilation of information and requirements for logistics footprint reductions, deployment requirements, and other factors affecting the in-theater operational concept.
- Initiate development of operating and support reliability objectives and their corresponding benefits and resource requirements. Consider performance histories of prior systems or systems of similar capability where feasible.
- Assess the concept and technology with regard to their ability to facilitate the use of embedded diagnostics, prognostics, and similar maintenance enablers.
- Initiate the compilation and assessment of data on the projected sustainment demand.

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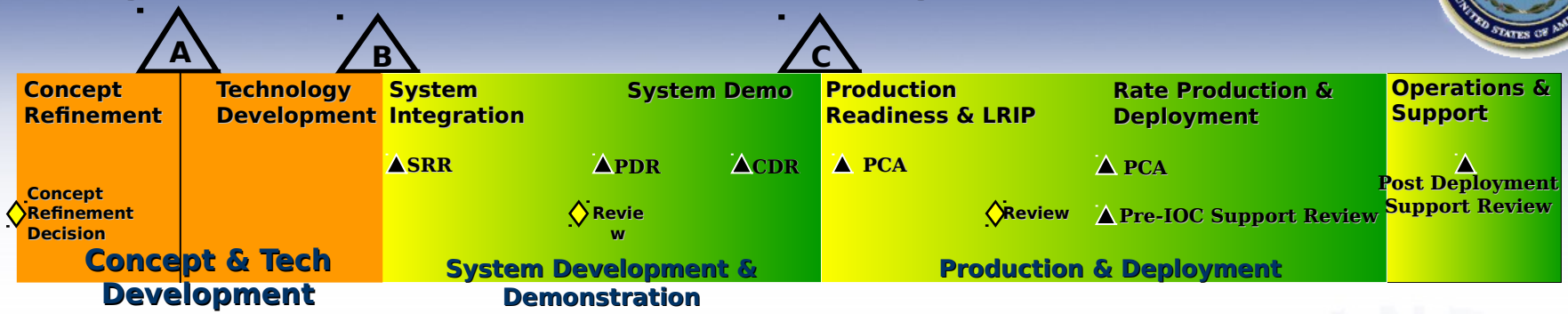

Key logistics information compiled during Concept Refinement and Technology Development includes:

- AoA to include alternative operating and system support concepts, with specific consideration of performance-based options.
- Identification of key performance and related support parameters for inclusion in the CDD and their basis as design requirements for subsequent phases to affect availability, reliability, maintainability, interoperability, manpower, and deployment footprint – the overall capability of the system to perform and endure in the required mission operational environment.
- Market analysis for system and product support capabilities (public and private) to define extent and scope of opportunities for achieving support objectives through design and viable product support strategies. Analysis should include:
  - Elements of support currently provided (for a legacy system to be replaced)
  - Current measures used to evaluate support effectiveness
  - Current efficacy of required support
  - All existing support data across the logistics support elements
  - Assessment of existing technologies and associated support that impact the new system under development
  - Initial identification of support-related risk and risk mitigation planning.
  - Design and technology, e.g. LOs, non-COTS, etc.
  - Future projections of domestic and foreign facilitation and logistics infrastructure

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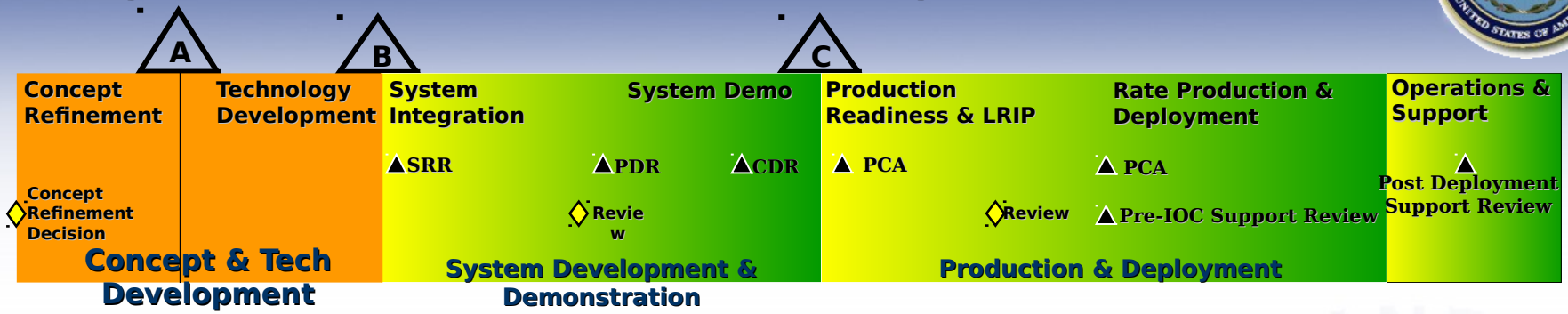

Key logistics activities that must be completed before Milestone B:

- Preparation and/or assessment of sustainment planning and parameters in the CDD
- Description of the product support strategy as documented in the Acquisition Strategy (ASR)
- Description of the appropriate logistics metrics, criteria, and funding requirements in the Acquisition Program Baseline (APB)
- Description of the appropriate logistics considerations and test points in the Test and Evaluation Master Plan (TEMP
- Operating and support concepts that identify the best balance between mission performance, life cycle cost, logistics footprint, and risk
- Logistics related performance parameters that best represent warfighter needs
- Potential SOE of the propose system based on available and planned technology available and planned.

The DoD Supportability Assessment Guide is downloadable a

dau.acc.mil.logistics (community of practice)

Performance Based Logistics and Total Life Cycle System Management:

- **Requires clarity with regard to the scope and definition of System Supportability, Reliability, and Maintainability**
  - **This is also necessary to better understand design and operations/support “cause-and-effects”,**
- **Requires the delineation of specific system effectiveness criteria**
  - **An industry survey to assess the current state of such metrics has been conducted and will soon be published,**
- **Integration of System R, M, and S issues and considerations into the early phases of the system acquisition framework,**
- **And finally, to better facilitate this integration, specific logistics criteria, information, activities have been defined for each of the acquisition phases.**